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REMARKS

Claims 1-7 and 27-39 are all the claims pending in the application. Claims 1-7 and 27-39 stand rejected on prior art grounds. Applicants respectfully traverse these objections/rejections based on the following discussion.

I. The Prior Art Rejections

Claims 1-3 and 5 stand rejected under 35 U.S.C. §102(b) as being anticipated by Levy (U.S. Patent No. 5,469,379). Claims 1 and 6 stand rejected under 35 U.S.C. §102(b) as being anticipated by Hsu et al. (U.S. Patent No. 5,166,556). Claims 4, 7, 27-31, and 33-38 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Levy (U.S. Patent No. 5,469,379). Claims 27, 32, and 39 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Hsu et al., hereinafter "Hsu" (U.S. Patent No. 5,166,556). Applicants respectfully traverse these rejections based on the following discussion.

A. The Rejections Based on Levy

Applicants respectfully traverse the anticipation and obviousness rejections that are based on Levy principally because the rejections takes an unreasonable position with respect to the term "fin" and for other reasons. One of the points of novelty of the claimed invention is an anti-fuse (a fuse that is an insulator until blown) that has a fin. It is apparent that during examination a clear example of a fin-type anti-fuse (as described in the specification and illustrated in the attached drawings) could not be located; however, in order to provide complete examination, a broad meaning of the claim term "fin" has been utilized. The Office Action correctly states that claims in a pending application should be given their broadest reasonable interpretation. However, one ordinarily skilled in the art would not consider the structure represented by items 55, 60, and 62 in Levy to reasonably be any form of "fin" as that term is commonly known, and

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this is especially true if one ordinarily skilled in the art interprets the claim language in light of the specification and drawings. Thus, as explained in greater detail below, Applicants submit that the Office Action, in attempting to provide complete and thorough examination, is being unreasonably broad with respect to the claim terminology.

For example, on page 7 in the "Response to Arguments" portion, the Office Action explains that the term "fin" is understood to be a projection that extends from a body. Applicants agree that a fin does extend from a body; however, not all projections from a body are fins. To the contrary, the use of the term fin within the rejections appears to equate any form of projection with a fin and it is Applicants position that such a broad interpretation of the term "fin" is not reasonable and would not be sustained upon appeal.

Applicants note that Levy does not describe the structures 55, 60, and 62 as any form of fin. To the contrary, Levy discloses a feature which is only described as "a programmable link 58", which is illustrated in Figures 2 and 3 as being rectangular in cross-section (column 3, line 53). There is no description within Levy which would indicate that the link 58 is formed in the shape of a fin. To the contrary, the remainder of Levy appears to indicate that the link 58 comprises a square or flat rectangle, or a disk-shaped structure that is not equivalent to the claimed structure which is explicitly defined to include "fin." The only description of the link 58 in Levy can be found in the paragraph appearing in column 3, lines 50-61, which describes that the link forms a selective connection between conductors 55 and 60. In this manner of description, the link 58 appears to be described as some type of a via between wiring layers 55 and 60. One ordinarily skilled in the art would understand that a via comprises flattened rectangular sections of wiring or openings filled with a material. Neither type of via could in any way be described as a fin structure because a via normally comprises a flattened square or disk of material that is wide and flat enough to reliably form an electrical connection between adjacent conductive structures. Therefore, Applicants submit that Levy clearly does not explicitly teach any type of fin structure and that the most that can be implied into the teachings of Levy is a flattened disk or rectangular structure.

While it is important to apply the broadest reasonable definition to terms used within

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claims in order to provide a quality examination of the claims, such interpretation of the language used within the claims cannot ignore the clear and unambiguous language within the claims. Here independent claim 1 defines a "fin" which is commonly understood to be a thin projection (which can be rectangular) that extends from a surface. The Office Action ignores the requirement in the claims for a "fin" and proposes that the link 58 within Levy (which is not described as being a fin and cannot reasonably be interpreted as being a fin, as described above) is somehow equivalent to the claimed fin structure. The terminology "fin" is not ambiguous and is a readily defined term found within common usage in many arts. Further, the specification fully describes the shape of the fin and illustrates the fin quite clearly in perspective view (Figure 6).

Therefore, Applicants respectfully submit that in this situation, the interpretation relied upon in the Office Action for the term "fin" would be considered unreasonably broad by one ordinarily skilled in the art, especially in light of the specification. By attempting to equate the link 58 in Levy with the term "fin" used in independent claim 1, the Office Action is attempting to render the term "fin" meaningless. If the interpretation of claim language would render the claim language meaningless, such an interpretation is overly broad and unreasonable.

The overly broad interpretation of the term "fin" becomes even more unreasonable with the limitations in independent claims 27 and 34. Independent claim 27 goes further and defines that the "fin has a height and length that exceeds a width of said fin" and independent claim 34 goes even further and defines that the "fin has a height and length that exceed more than 2 times a width of said fin." As noted above, a broad interpretation has been applied to the claim term "fin." However, such an interpretation cannot apply to independent claims 27 and 34 because the relative dimensions of the fin are described. The Office Action argued that the claim differences between independent claims 27 and 34 and independent claim 1 are obvious based on discovering optimal or workable ranges. To the contrary, there is no fin in Levy upon which one ordinarily skilled in the art could discover optimal or workable ranges, much less one that has a height and length that exceed its width.

More specifically, the rejection cites Figure 2 of Levy as comprising a fin having a center

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portion 58 and end portions (55, 60), however a closer examination of Levy reveals that (see col. 3 lines 55-61) layers 55 and 60 are 'metal conductors' and these are not included in a fin structure. More specifically, the 'cross points of the metal conductors 55 and 60 are separated by a non-conductive or "open" link' (Col 3 lines 60-61). So Levy explicitly teaches 55 and 60 to be separate wiring levels forming a cross point connection. To the contrary, the claims define a structure with a fin with end portions that are conductive and a center portion that is substantially non-conductive. A cross point is well understood to be to (conductive) wires running in a non-parallel (usually orthogonal) fashion to one another with a structure of interest formed at the intersection of the two wires. Thus, Levy would teach away from a fin structure where the end portions are typically parallel to one another and even collinear, incapable of forming a cross point. The structure of Levy would become inoperable as a fin structure, as it could not be formed by cross point wires without 'short-circuiting' the two wires. Further, the claimed invention is required to solve the problem of collinear ends of the fin surrounding the center portion.

The Office Action rejects claims 4, 30 and 37 as obvious in light of Levy, however the invention of Levy requires that 55 and 60 be quite thick as the form 'cross point' wires and must be of very low resistance to be electrically operable, while the 'link' 58 must be thin to allow for heating with a low voltage. Since there is no "fin" taught in Levy, it is difficult to interpret exactly what '10% of the length of the fin' would mean in the work of Levy, however the art taught in Levy would be impractical with 58 having a length 10% of that of layers 60 or 55 as these layers are described as cross point wires which are typically the length of an entire cell array; this would be prohibitively large. Similarly the rejection of claims 7, 27, 33, and 34 are problematic in the work of Levy. The width of the layer 58 is lithographically determined and expected to be comparable to the height of the memory structure by one ordinarily skilled in the art.

The interpretation of the claim language within the rejections is further flawed where the rejections states that "product by process" limitations are included in the claim. More specifically, the second limitation in independent claim 1 describes that the center portion of the

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fin changes from non-conductive to a permanent conductor when heated. Product by process claim limitations describe a product according to the manner in which it is manufactured. One ordinarily skilled in the art of anti-fuses would clearly understand that the claimed limitation has nothing to do with the process for manufacturing the device, but instead has to do with how the device operates after it is manufactured. As is known in the art, when a fuse is blown, the fuse changes from a conductor into an insulator. Similarly, when an antifuse is blown, the anti-fuse changes from an insulator into a conductor. Thus, the second limitation in independent claim 1 would clearly be understood by one ordinarily skilled in the art not as a product by process limitation, but instead as an operating characteristic of the final structure. Here, the limitation does not relate to any manufacturing process, but instead further defines the operating characteristics of the previously manufactured device. Therefore, the position in the rejections with respect to the non-applicability of product by process limitations is misplaced.

Therefore, as shown above, Levy does not disclose or suggest the claimed "fin" defined by independent claims 1, 27, and 34. Failing to disclose a fin, Levy cannot teach or suggest that, in the fin "end portions comprise conductors" or that "said center portion of said fin comprises a substantially non-conductive region." Simply put, while Levy discloses an anti-fuse structure, Levy does not disclose or suggest any form of anti-fuse structure that includes a fin. Thus, Applicants respectfully submit that independent claims 1, 27, and 34 are not anticipated or rendered obvious by Levy. Further, dependent claims 2-5, 28-31, 33, and 35-38 are similarly not anticipated or rendered obvious by Levy. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw these rejections.

B. The Rejections based on Hsu

Applicants respectfully traverse the anticipation and obviousness rejections because Hsu does not disclose (or suggest) the use of a fin within an antifuse structure. To the contrary, Hsu discloses an antifuse "layer" 30 that is illustrated in Figure 2 as being V-shaped in cross-section. There is no description within Hsu which would indicate that the antifuse layer 30 is formed in the shape of a fin.

One of the points of novelty of the claimed invention is an anti-fuse (a fuse that is an insulator until blown) that has a fin. It is apparent that during examination a clear example of a fin-type anti-fuse (as described in the specification and illustrated in the attached drawings) could not be located; however, in order to provide complete examination, a broad meaning of the claim term "fin" has been utilized. The Office Action correctly states that claims in a pending application should be given their broadest reasonable interpretation. However, one ordinarily skilled in the art would not consider the structure represented by layer 30 in Hsu to reasonably be any form of "fin" as that term is commonly known, and this is especially true if one ordinarily skilled in the art interprets the claim language in light of the specification and drawings. Thus, as explained in greater detail below, Applicants submit that the Office Action, in attempting to provide complete and thorough examination, is being unreasonably broad with respect to the claim terminology.

For example, on page 7 in the "Response to Arguments" portion, the Office Action explains that the term "fin" is understood to be a projection that extends from a body. Applicants agree that a fin does extend from a body; however, not all projections from a body are fins. To the contrary, the use of the term fin within the rejections appears to equate any form of projection with a fin and it is Applicants position that such a broad interpretation of the term "fin" is not reasonable and would not be sustained upon appeal.

While it is important to apply the broadest reasonable definition to terms used within claims in order to provide a quality examination of the claims, such interpretation of the language used within the claims cannot ignore the clear and unambiguous language within the claims. Here independent claim 1 defines a "fin" which is commonly understood to be a thin projection

(which can be rectangular) that extends from a surface. The Office Action ignores the requirement in the claims for a "fin" and proposes that the antifuse layer 30 within Hsu (which is not described as being a fin and cannot reasonably be interpreted as being a fin) is somehow equivalent to the claimed fin structure. The terminology "fin" is not ambiguous and is a readily defined term found within common usage in many arts. Further, the specification fully describes the shape of the fin and illustrates the fin quite clearly in perspective view (Figure 6). Therefore, Applicants respectfully submit that in this situation, the interpretation relied upon in the Office Action for the term "fin" is unreasonably broad. By attempting to equate the V-shaped antifuse layer 30 in Hsu with the term "fin" used in independent claim 1, the Office Action is attempting to render the term "fin" meaningless. If the interpretation of claim language would render the claim language meaningless, such an interpretation is overly broad and unreasonable.

The Office Action suggests that 26, 32 comprise end portions of a fin with center portion 30. Inspection of Hsu, however, reveals key elements that are missing from the claimed invention. In particular the antifuse of Hsu comprises "a layer 26 of titanium, or other refractory metal or metal silicide, thicker than 50nm" (col. 6 lines 11, 12) and "a layer 32 of more than 50 nanometers of titanium of other refractory metal or metal silicide" (col. 6 lines 23, 24) and "30 nanometers to 400 nanometers of an off-stoichiometric amorphous silicon-based dielectric layer" (col. 6 lines 17-19) which is sandwiched between 26 and 32. Note that these three portions of the antifuse of Hsu are three distinct layers of materials. The structure of Hsu would not be operable as a fin. The first layer 26 could not support the dielectric layer 30 with a contacted layer 32 above since such a structure would result in a direct connection between layers 26 and 32. Additionally, the contact opening 28 would straddle the entire fin and also 'short-circuit' a fin structure. Thus, the structure of Hsu would not be operable as a fin.

Therefore, as shown above, Hsu does not disclose or suggest the claimed "fin" defined by independent claim 1. Failing to disclose a fin, Hsu cannot teach or suggest that, in the fin "end portions comprise conductors" or that "said center portion of said fin comprises a substantially non-conductive region." Simply put, while Hsu discloses an anti-fuse structure, Hsu does not disclose or suggest any form of anti-fuse structure that includes a fin. Thus, Applicants respectfully submit that independent claim 1 is patentable over Hsu.

The overly broad interpretation of the term "fin" becomes even more unreasonable with the limitations in independent claims 27 and 34. Independent claim 27 goes further and defines that the "fin has a height and length that exceeds a width of said fin" and independent claim 34 goes even further and defines that the "fin has a height and length that exceed more than 2 times a width of said fin." As noted above, a broad interpretation has been applied to the claim term "fin." However, such an interpretation cannot apply to independent claims 27 and 34 because the relative dimensions of the fin are described. The Office Action argued that the claim differences between independent claims 27 and 34 and independent claim 1 are obvious based on discovering optimal or workable ranges. To the contrary, there is no fin in Hsu upon which one ordinarily skilled in the art could discover optimal or workable ranges, much less one that has a height and length that exceed its width.

The interpretation of the claim language within the rejections is further flawed where the rejections states that "product by process" limitations are included in the claim. More specifically, the second limitation in independent claim 1 describes that the center portion of the fin changes from non-conductive to a permanent conductor when heated. Product by process claim limitations describe a product according to the manner in which it is manufactured. One ordinarily skilled in the art of anti-fuses would clearly understand that the claimed feature has nothing to do with the process for manufacturing the device, but instead has to do with how the device operates after it is manufactured. As is known in the art, when a fuse is blown, the fuse changes from a conductor into an insulator. Similarly, when an antifuse is blown, the anti-fuse changes from an insulator into a conductor. Thus, the second limitation in independent claim 1 would clearly be understood by one ordinarily skilled in the art not as a product by process limitation, but instead as an operating characteristic of the final structure. Here, the limitation does not relate to any manufacturing process, but instead further defines the operating characteristics of the previously manufactured device. Therefore, the position in the rejections with respect to the non-applicability of product by process limitations is misplaced.

Therefore, as shown above, Hsu does not disclose or suggest the claimed "fin" defined by independent claims 1, 27, and 34. Failing to disclose a fin, Hsu cannot teach or suggest that, in the fin "end portions comprise conductors" or that "said center portion of said fin comprises a

substantially non-conductive region." Simply put, while Hsu discloses an anti-fuse structure, Hsu does not disclose or suggest any form of anti-fuse structure that includes a fin. Thus, Applicants respectfully submit that independent claims 1, 27, and 34 are not anticipated or rendered obvious by Hsu. Further, dependent claims 6, 32, and 39 are similarly not anticipated or rendered obvious by Hsu. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw these rejections.

II. Formal Matters and Conclusion

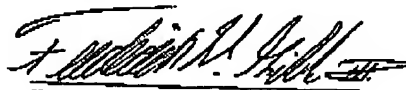
In view of the foregoing, Applicants submit that claims 1-7 and 27-39, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,

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